FlyBy Math™ Alignment
Essential Academic Learning Requirements
And Grade Level Expectations

EALR 1: The student understands and applies the concepts and procedures of mathematics.

Component 1.1: Understand and apply concepts and procedures from number sense.

NUMBER AND NUMERATION

GLE 1.1.4 Apply understanding of direct and inverse proportion to solve problems..

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Solve problems using direct or inverse *(proportion)* models.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
▪ Use direct or inverse proportion to determine a number of objects or a measurement in a given situation.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

ESTIMATION

GLE 1.1.8 Apply estimation strategies to predict or determine the reasonableness of answers in situations involving multi-step computation with rational numbers including whole number powers and square and cube roots.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Use estimation to predict or to verify the reasonableness of calculated results.	--Predict outcomes and explain results of mathematical models and experiments. --Compare predictions, calculations, and experimental evidence for several aircraft conflict problems.

Component 1.2: Understand and apply concepts and procedures from measurement.

PROCEDURES, PRECISION, AND ESTIMATION

GLE 1.2.6 Understand and apply strategies to obtain reasonable measurements at an appropriate level of precision.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Estimate quantities using derived units of measure (e.g., distance or time using miles per hour, cost using unit cost).	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Predict outcomes and explain results of mathematical models and experiments.

Component 1.3: Understand and apply concepts and procedures from geometric sense.	
LOCATIONS AND TRANSFORMATIONS	
GLE 1.3.3 Apply understanding of geometric properties and location of points.	
Evidences of Learning	***FlyBy Math™* Activities**
▪ Represent situations on a coordinate grid or describe the location of points that satisfy given conditions	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
▪ Identify, interpret, and use the meaning of slope of a line as a rate of change using physical, symbolic, and technological models.	--Interpret the slope of a line in the context of a distance-rate-time problem. --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

Component 1.4: Understand and apply concepts and procedures from probability and statistics.	
STATISTICS	
GLE 1.4.4 Understand and apply techniques to find the equation for a reasonable linear model.	
Evidences of Learning	***FlyBy Math™* Activities**
▪ Create a graph based on the equation for a line.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
Component 1.5: Understand and apply concepts and procedures from algebraic sense.	
PATTERNS, FUNCTIONS, AND OTHER RELATIONS	
GLE 1.5.1 Apply processes that use repeated addition (linear) or repeated multiplication (exponential).	
Evidences of Learning	***FlyBy Math™* Activities**
▪ Translate among equivalent numerical, graphical, and algebraic forms of a linear function.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
▪ Make predictions based on a pattern or sequence.	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
GLE 1.5.2 Analyze a pattern, table, graph, or model involving repeated addition (linear) or repeated multiplication (exponential) to write an equation or rule.	
Evidences of Learning	***FlyBy Math™* Activities**
▪ Generate and use rules for a pattern to make predictions about future events	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.

▪ Represent systems of equations and inequalities graphically.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.
▪ Write an expression, equation, or inequality with two variables representing a linear model of a real-world problem.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
SYMBOLS AND REPRESENTATIONS	
GLE 1.5.4 Apply understanding of equations, tables, or graphs to represent situations involving relationships that can be written as repeated addition (linear) or repeated multiplication (exponential).	
Evidences of Learning ▪ Identify and use variable quantities to read and write expressions and equations to represent situations that can be described using repeated addition (e.g., models that are linear in nature).	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
EVALUATING AND SOLVING	
GLE 1.5.6 Apply procedures to solve equations and systems of equations.	
Evidences of Learning ▪ Solve real-world situations involving linear relationships and verify that the solution makes sense in relation to the problem.	***FlyBy Math™* Activities** --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
▪ Find the solution to a system of linear equations using tables, graphs, and symbols.	--Use tables, graphs, and equations to solve aircraft conflict problems. --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
▪ Interpret solutions of systems of equations.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
▪ Use systems of equations to analyze and solve real-life problems.	--Use tables, graphs, and equations to solve aircraft conflict problems. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

▪ Use systems of equations to determine the most advantageous outcome given a situation (e.g., given two investment options, determine under what conditions each will yield the best result.)	--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

EALR 2: The student uses mathematics to define and solve problems.

Component 2.1: Understand problems.

GLE 2.1.1 Analyze a situation to define a problem.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Define the problem.	--Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.

Component 2.2: Apply strategies to construct solutions.

GLE 2.2.1 Apply strategies, concepts, and procedures to devise a plan to solve the problem.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Select and apply appropriate mathematical tools to devise a strategy in a situation.	--Conduct simulation and measurement for several aircraft conflict problems. --Use tables, graphs, and equations to solve aircraft conflict problems.

GLE 2.2.2 Apply mathematical tools to solve the problem.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Implement the plan devised to solve the problem.	--Conduct simulation and measurement for several aircraft conflict problems. --Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.
▪ Use mathematics to solve the problem (e.g., use algebra to write equations for the two linear models, solve the system of equations using either symbols or technology).	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
▪ Check the solution to see if it works.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system. --Compare predictions, calculations, and experimental evidence for several aircraft conflict problems.

EALR 3: The student uses mathematical reasoning.	
Component 3.2: Make predictions, inferences, conjectures, and draw conclusions.	
GLE 3.2.2 Analyze information to draw conclusions and support them using inductive and deductive reasoning.	
Evidences of Learning	***FlyBy Math™* Activities** --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

EALR 4: The student communicates knowledge and understanding in both everyday and mathematical language.	
Component 4.1: Gather information.	
GLE 4.1.2 Synthesize mathematical information for a given purpose from multiple, self-selected sources.	
Evidences of Learning	***FlyBy Math™* Activities** --Conduct simulation and measurement for several aircraft conflict problems. --Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.
Component 4.2: Organize, represent, and share information.	
GLE 4.2.1 Analyze mathematical information to organize, clarify, and refine an argument.	
Evidences of Learning	***FlyBy Math™* Activities** ---Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
GLE 4.2.2 Understand how to express ideas and situations using mathematical language and notation.	
Evidences of Learning	***FlyBy Math™* Activities** --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

EALR 5: The student understands how mathematical ideas connect within mathematics, to other subject areas, and to real-life situations.

Component 5.1: Relate concepts and procedures within mathematics.

GLE 5.1.1 Apply multiple mathematical concepts and procedures in a given problem or situation.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Estimate derived units of measure (e.g., miles per hour, people/year, grams/cubic centimeters).	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Predict outcomes and explain results of mathematical models and experiments.

GLE 5.1.2 Understand how to use different mathematical models and representations in the same situation.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Identify, interpret, and use the meaning of slope of a line as a rate of change using concrete, symbolic, and technological models.	--Interpret the slope of a line in the context of a distance-rate-time problem.
▪ Find the equation of a line in a variety of ways (e.g., from a table, graph, slope-intercept, point-slope, two points).	--Interpret the slope of a line in the context of a distance-rate-time problem. --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
▪ Find the solution to a system of linear equations using tables, graphs and symbols.	--Use tables, graphs, and equations to solve aircraft conflict problems. --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.

Component 5.2: Relate mathematical concepts procedures to other disciplines.

GLE 5.2.1 Analyze mathematical patterns and ideas to extend mathematical thinking and modeling in other disciplines.

Evidences of Learning	***FlyBy Math*™ Activities**
▪ Justify a prediction or an inference based on a set of data.	--Predict outcomes and explain results of mathematical models and experiments. --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

Component 5.3: Relate mathematical concepts procedures to real-world situations.	
GLE 5.3.1 Understand situations in which mathematics can be used to solve problems with local, national, or international implications.	
Evidences of Learning ▪ Represent situations on a coordinate grid or describe the location of points that satisfy given conditions.	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
GLE 5.3.2 Understand the mathematical knowledge and training requirements for occupational/career areas of interest.	
Evidences of Learning ▪ Select a career and research the mathematics necessary to get the job and the mathematics used in the job.	***FlyBy Math™* Activities** --Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.